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GENETICALLY ENGINEERED FOODS AND THE ENVIRONMENT

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Industry developed genetically engineered (GE) crops and introduced them to the market with the promise of higher crop yields, but the only things that have increased are the use of toxic herbicides and pesticides, resistant weeds and bugs, contaminated crops and chemical industry profits.

SUPERWEEDS

When the first herbicide-tolerant GE crops were planted in the U.S. 15 years ago, some experts warned that the technology would accelerate the development of "superweeds" that would be resistant to the herbicides used with the crops. They were right. Superweeds, which evolve to withstand the very chemicals designed to kill them, have now become an epidemic on farmland in many locations across the country.

The most common superweeds are resistant to glyphosate, the active ingredient in Monsanto's popular herbicide Roundup, but resistance is appearing to herbicides used with other GE crops as well. Today, more than 61.2 million acres of American farmland are infested with weeds resistant to Roundup, which has been the world's best-selling weed killer for 32 years. A 2012 survey showed that 49 percent of U.S. farmers reported finding "superweeds" in their fields.[1]

As weeds became resistant, growers have applied still more herbicides to try to control them. A recent study found that over the 16 years from 1996 to 2011, the use of GE crops increased herbicide use by 527 million pounds,[2] putting consumers and the environment increasingly at risk.

The emergence of glyphosate-resistant superweeds has led growers to turn to older herbicides such as dicamba and 2,4-D, an ingredient used in Agent Orange, the notorious Vietnam War era defoliant, resulting in the emergence of weed species that are resistant to multiple chemicals. Already, a recent study found that 28 species worldwide are resistant to 2,4-D and/or dicamba.[3] By 2019, the study concluded, these trends could result in enormous additional increases in herbicide use, such as a 30-fold increase in the amount of 2,4-D applied to the American corn crop.

Both dicamba and 2,4-D are volatile chemicals that evaporate and can drift well beyond their targets, especially in warmer weather, posing a significant public health risk to nearby rural communities. Studies have linked springtime applications of 2,4-D to reproductive problems, spontaneous abortions, birth defects[4] and an elevated risk of non-Hodgkin's lymphoma.

The emergence of superweeds resistant to multiple herbicides has demonstrated that the strategy of combatting weeds by engineering crops that can withstand herbicides and then blasting fields with those chemicals is no match for evolutionary adaptation. This approach leads to a toxic dead end, one that will leave the landscape infested with ever more varieties of resistant superweeds while undermining efforts at safe, sustainable farming.[5]

SUPERBUGS

In 2003, Monsanto introduced the first crop engineered to kill insect pests that attack it. Its scientists modified the DNA of corn with genetic material from the bacterium *Bacillus thuringiensis* (Bt) to induce the plants to produce a protein fatal to rootworms, which cause a devastating corn blight.

As with superweeds, however, recent evidence has shown that rootworms have begun developing resistance to the protein produced by Bt corn. First observed during the 2009 growing season, these "superbugs" are now prevalent throughout the corn belt, predominantly in Illinois, Iowa, Minnesota, Nebraska and South Dakota.[6]

Certain agricultural "best practices," such as rotating GE and non-GE crops, can slow the development of superweeds and superbugs, but a 2011 study found that around 40 percent of American farmers do not follow those practices.[7]

To date, crops engineered to reduce sprayed insecticide use have done the opposite, increasing the need for insecticides. Continuing the application of these insecticides will increase insect resistance in the long run and may have damaging effects on honeybee populations and soil diversity.[8]

CROSS-CONTAMINATION

With genetically engineered crops covering about half of all harvested cropland in the United States,[9] many organic farmers are struggling to prevent cross-contamination, which occurs when seed or pollen from GE cropland drifts onto neighboring plots. It has become evident that current industry standards for separating GE fields from organic cropland are inadequate. Wind, insects, floods and machinery spread seed and pollen over considerable distances.

This has become a major issue for growers hoping to sell their crops in countries that strictly regulate or ban GE foods, hurting exports and farmers' profits. According to one estimate, the potential losses in sales or lower prices for farmers growing organic and GM-free corn may total $90 million annually.[10]

Contaminated seed can spread remarkably far. In 2000, a GE corn crop which was not approved for use as food and which accounted for just 1 percent of the total harvest managed to contaminate half the national supply,[11] resulting in a nationwide recall that ultimately cost the company that developed Bt corn about $1 billion.[12]

Once a field has been planted with GE seed, it is difficult to assure future plantings will not be affected. GE crops can persist and remain viable in soil for years. In one case, residual GE canola seeds were found in the soil 10 years after being planted.[13]

CONCLUSION

Advancements in GE technology that were intended to make it easier for farmers to protect their crops from weeds and pests have instead increased the use of herbicides and pesticides and led to the emergence of superweeds and superbugs. This bitter outcome calls for a more integrated approach to crop and pest management.

ENDNOTES

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